

New tissue valve prostheses

The new kids on the block

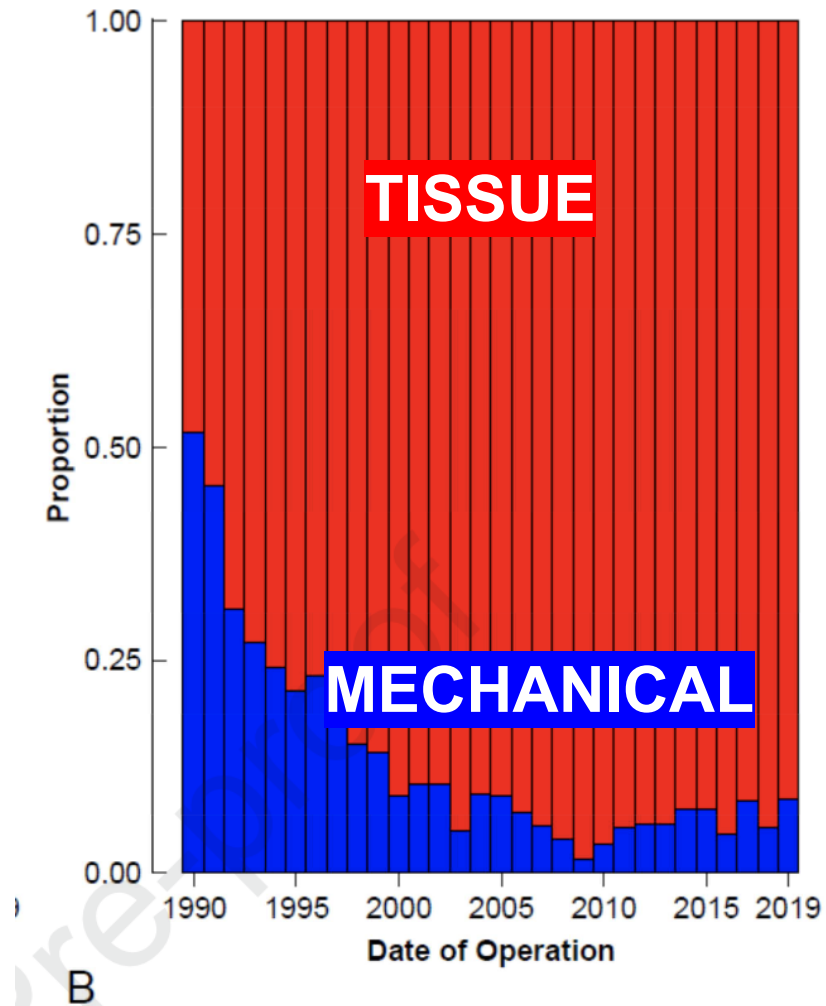
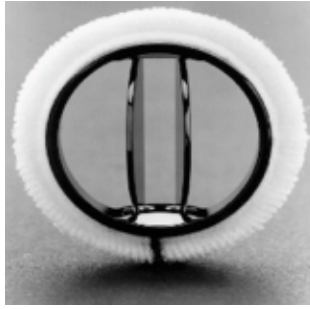
Prof. dr. B. Meuris

Cardiac Surgery

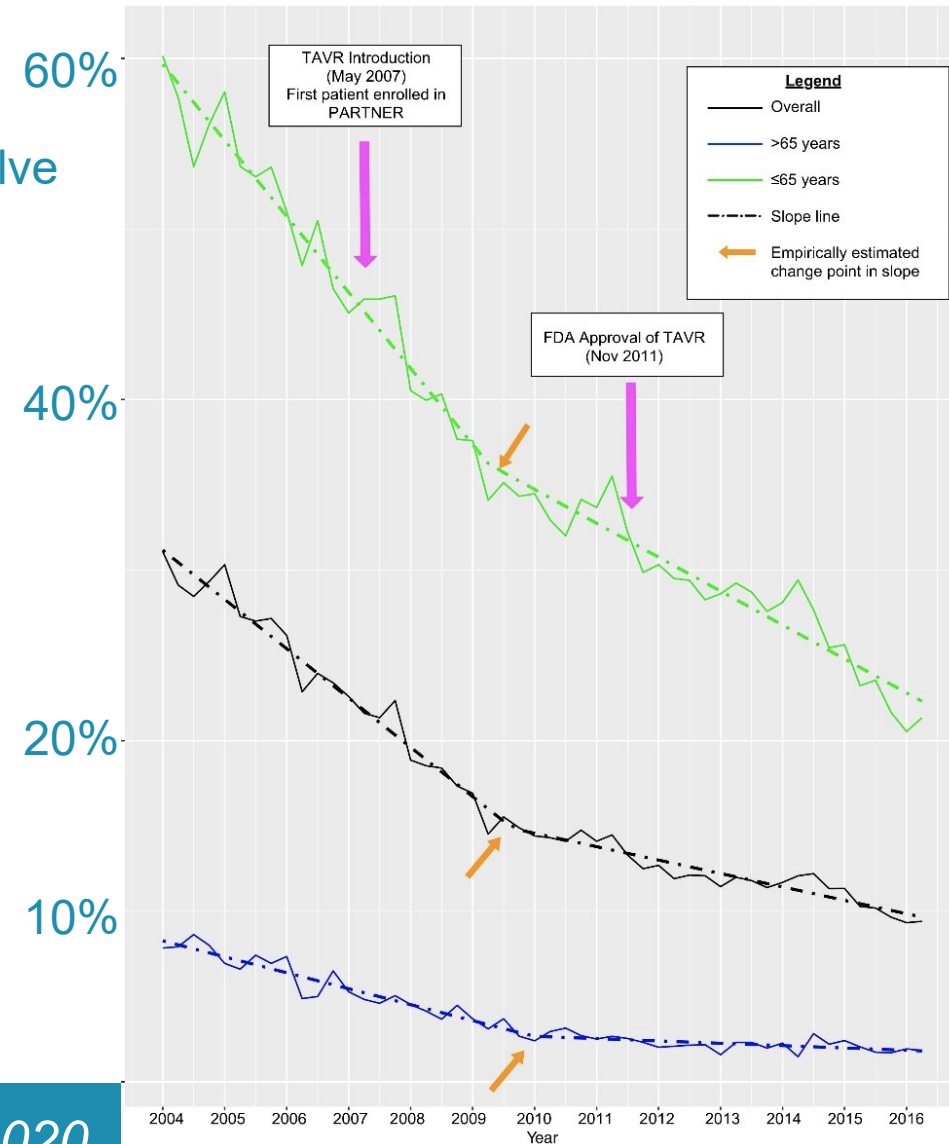
University Hospitals Leuven



Decrease in mechanical valves across all age categories

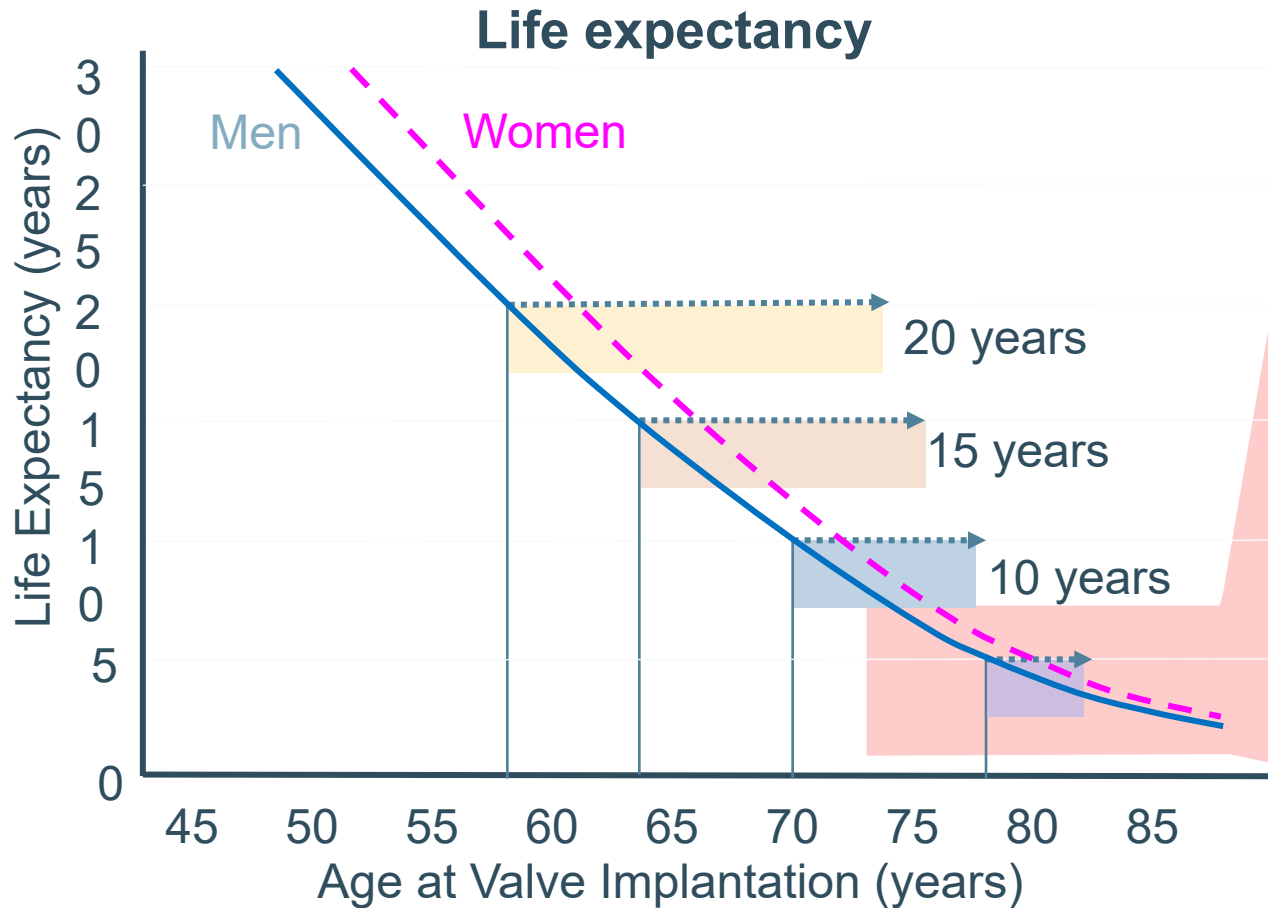


Percentage
mechanical valve
use

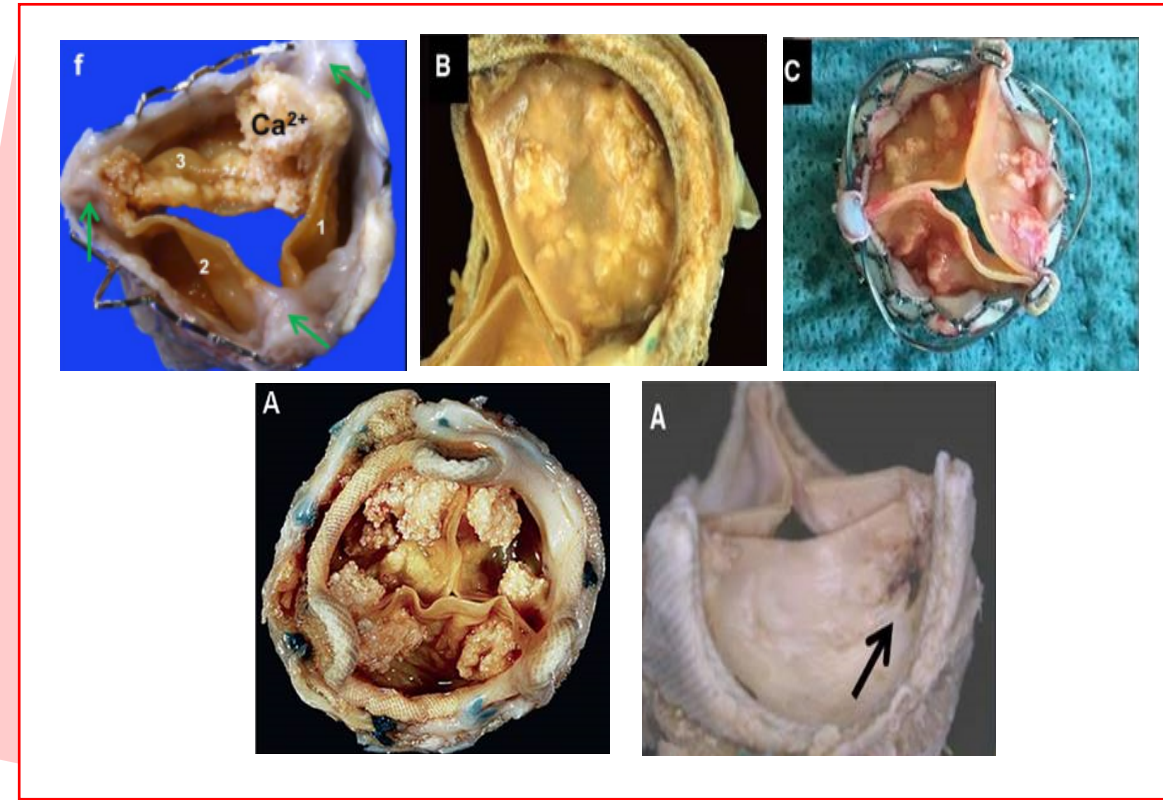


Young patients need a valve that lasts >20y

Old technologies are failing within the patient's lifetime

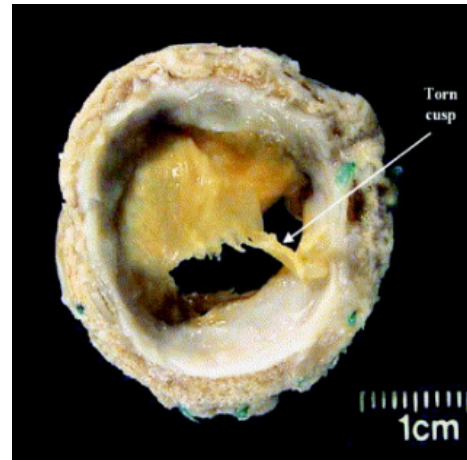


Windecker, TCT, 2019



Lancelotti, JACC, 2019

Structural valve degeneration in tissue valves



Hemodynamic factors

Position
Patient-prosthesis mismatch
• Valve size
• BSA
Persistent LVH
Gradient

SVD

Patient factors

Age
Renal function
Immune respons
Lipid metabolism
Diabetes
BSA / BMI
Gender
Pregnancy
AC-treatment
Proteins / enzymes
Infection

Valve factors

Design

Tissue origin
• Porcine
• Bovine

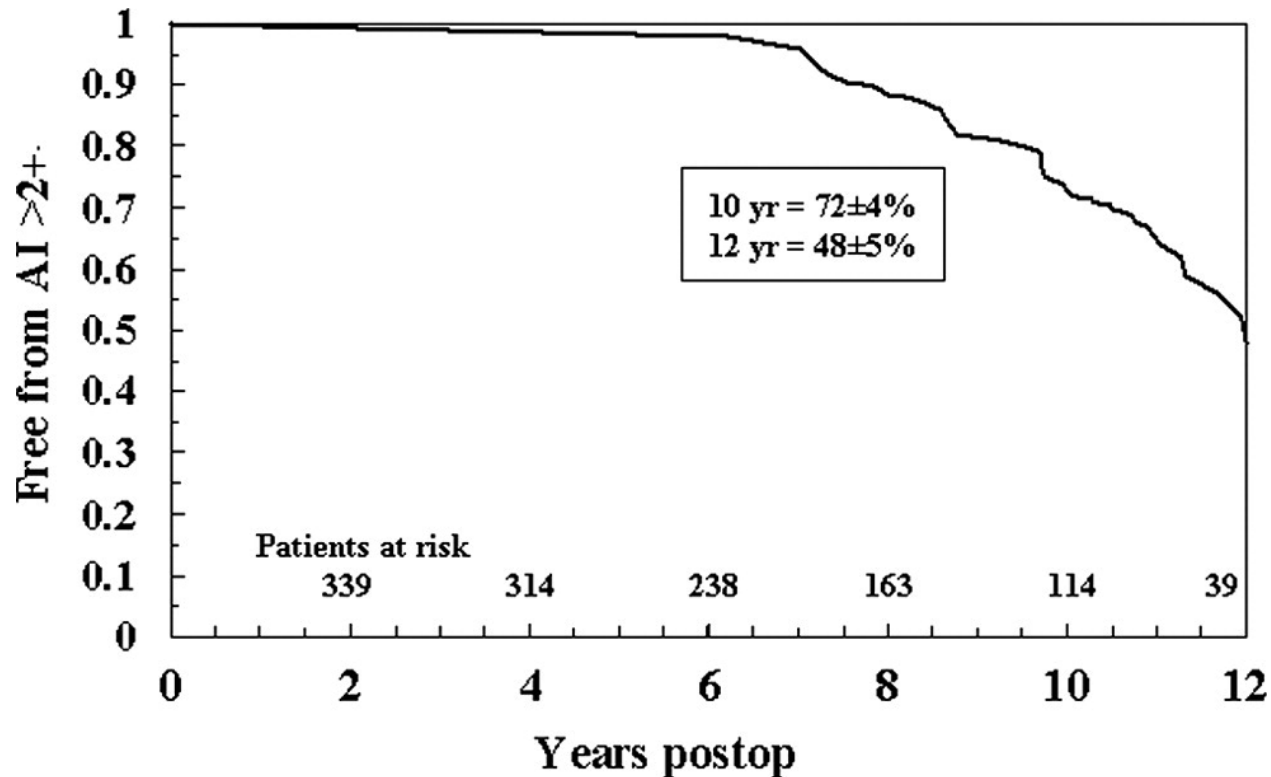
Tissue treatment

• Aldehydes
• Fosfolipids
• Storage
Valve size
Implant technique

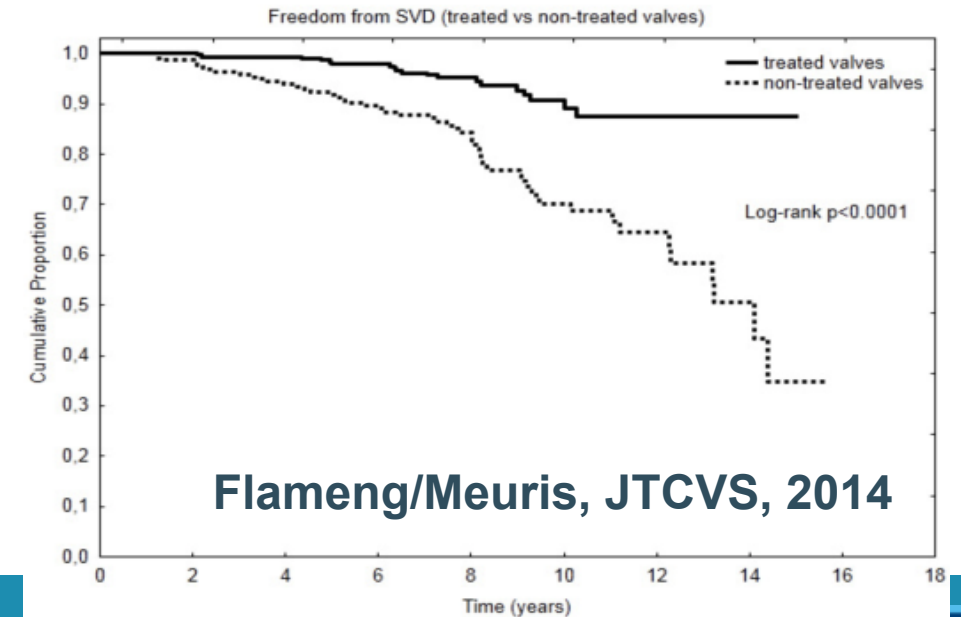
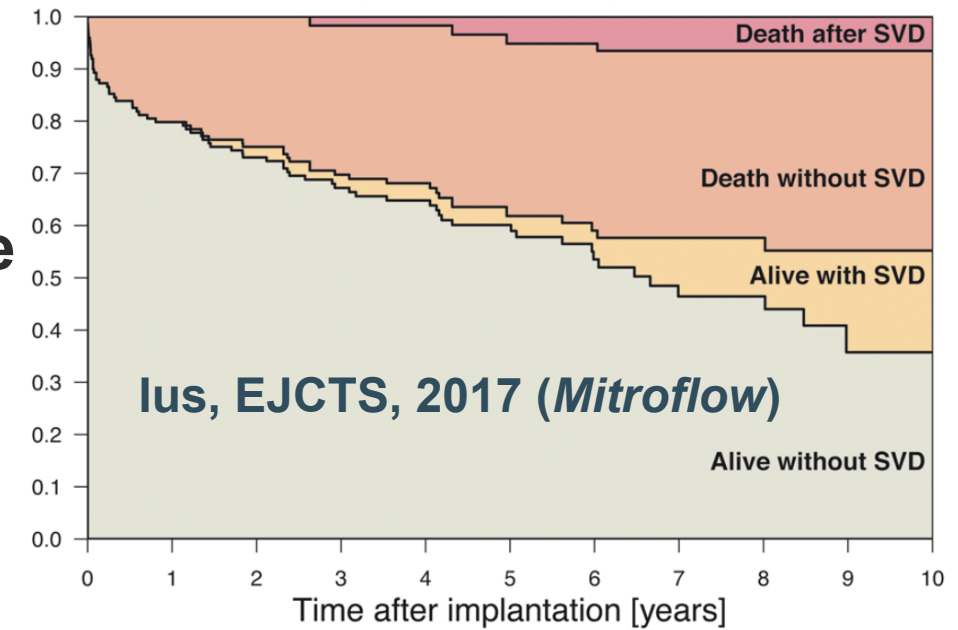


Importance of tissue treatments

- Obvious rapid degeneration in untreated tissue
→ No longer in commercial use



David, JTCVS, 2008 (*Toronto SPV*)



Flameng/Meuris, JTCVS, 2014

We need tissue treatments to delay calcification

- Most recent tissue treatments address several aspects

1. Optimized glutaraldehyde fixation

- Detoxification methods to block free aldehydes

2. Removal of fosfolipid remnants/ cell debris

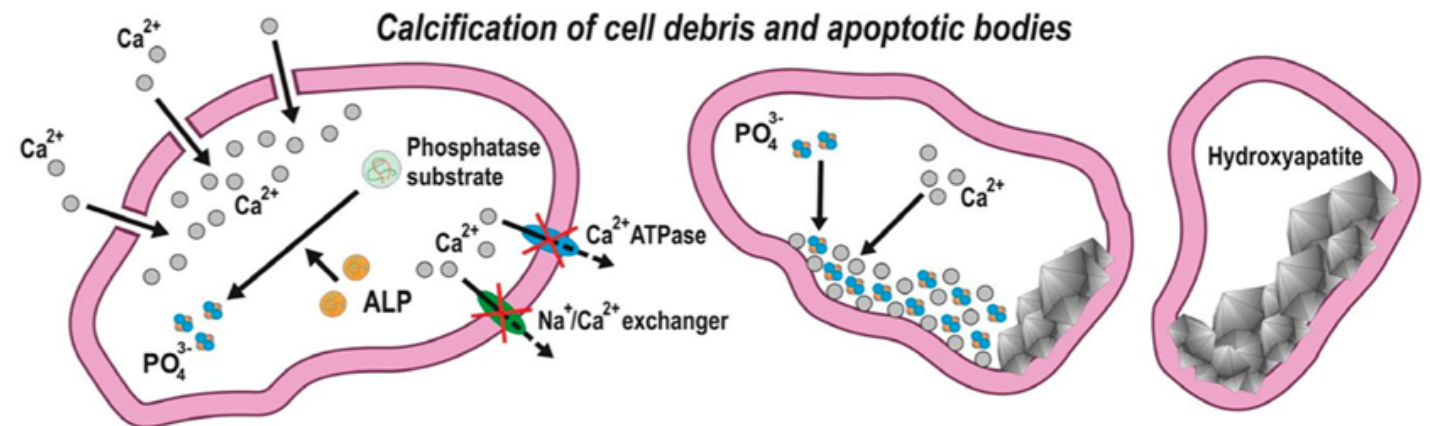
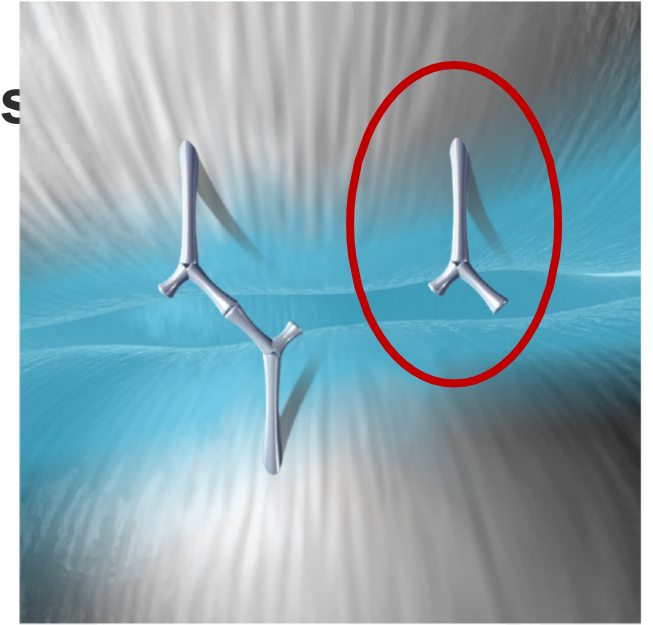
- Detergents / ethanols

- Decellularization ?

3. Avoid renewed exposure to aldehydes in storage solution

- Alternative storage solutions

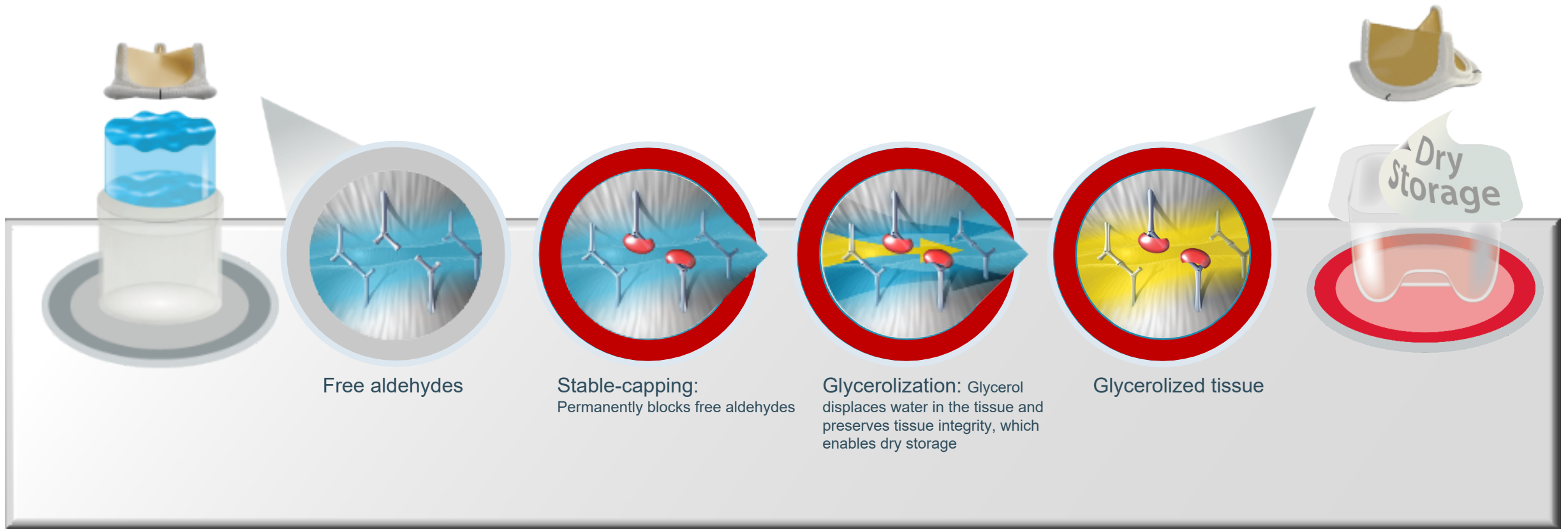
- Dry storage



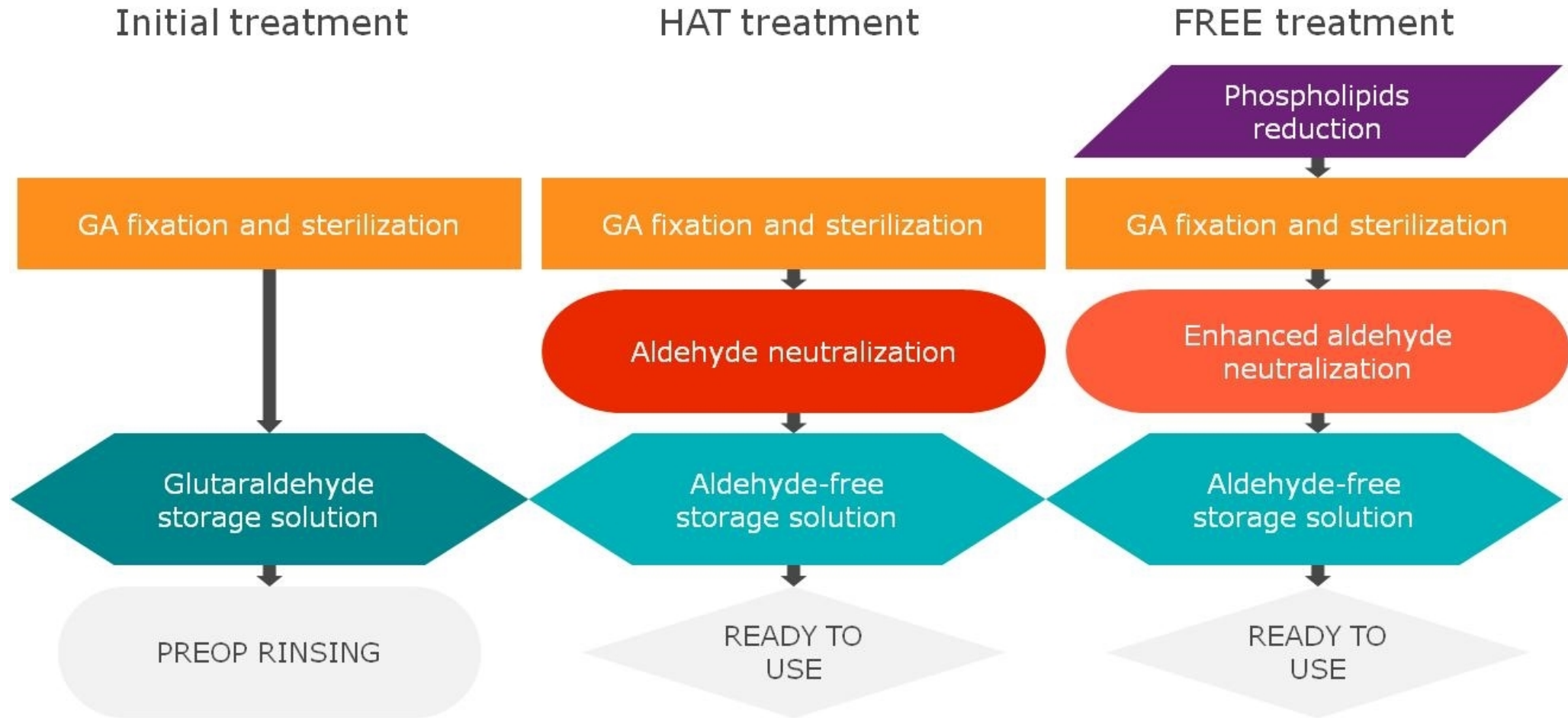
Tissue treatments are evolving

Valve	Treatment	Phospholipid reduction	Aldehyde detoxification	Aldehyde-free storage
Mitroflow	-	X	X	X
Hancock	T6	✓	X	X
Crown	PRT	✓	X	X
Perceval	HA	X	✓	✓
Solo	HA	X	✓	✓
Mosaic	AOA	✓	✓	X
Freestyle	AOA	✓	✓	X
Perimount	Xenologix	✓	X	X
Magna	Thermafix	✓	✓	X
Epic	Linx	✓	✓	X
Trifecta	Linx	✓	✓	X
Avalus	AOA	✓	✓	X
Inspiris	RESILIA	✓	✓	✓
Perceval Plus	FREE	✓	✓	✓

RESILIA treatment



FREE treatment



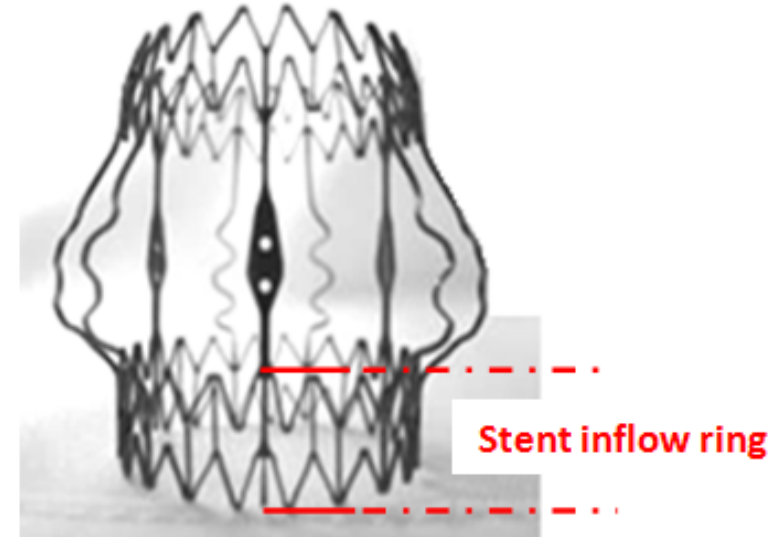
Valve design modifications ?

Flexibility – Visibility for later V-in-V



VFit technology

- Fluoroscopically visible size markers
- Expansion zone



Sutureless Valves: Perceval

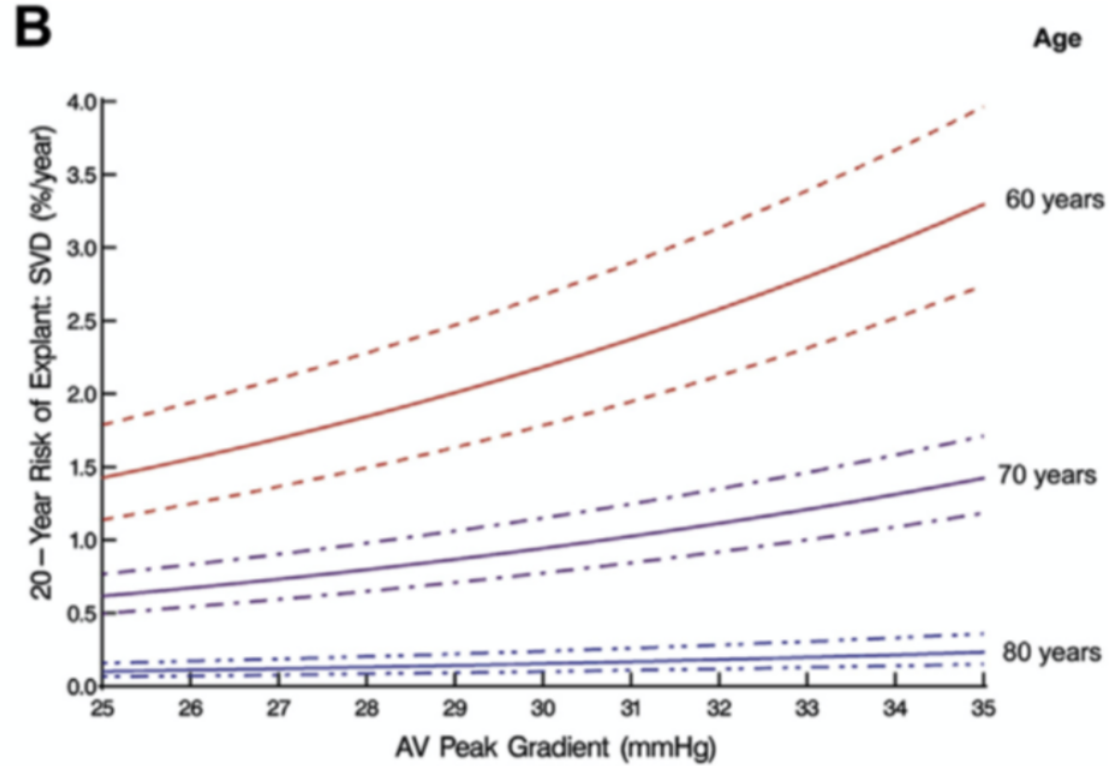
- Facilitating minimal invasive surgery



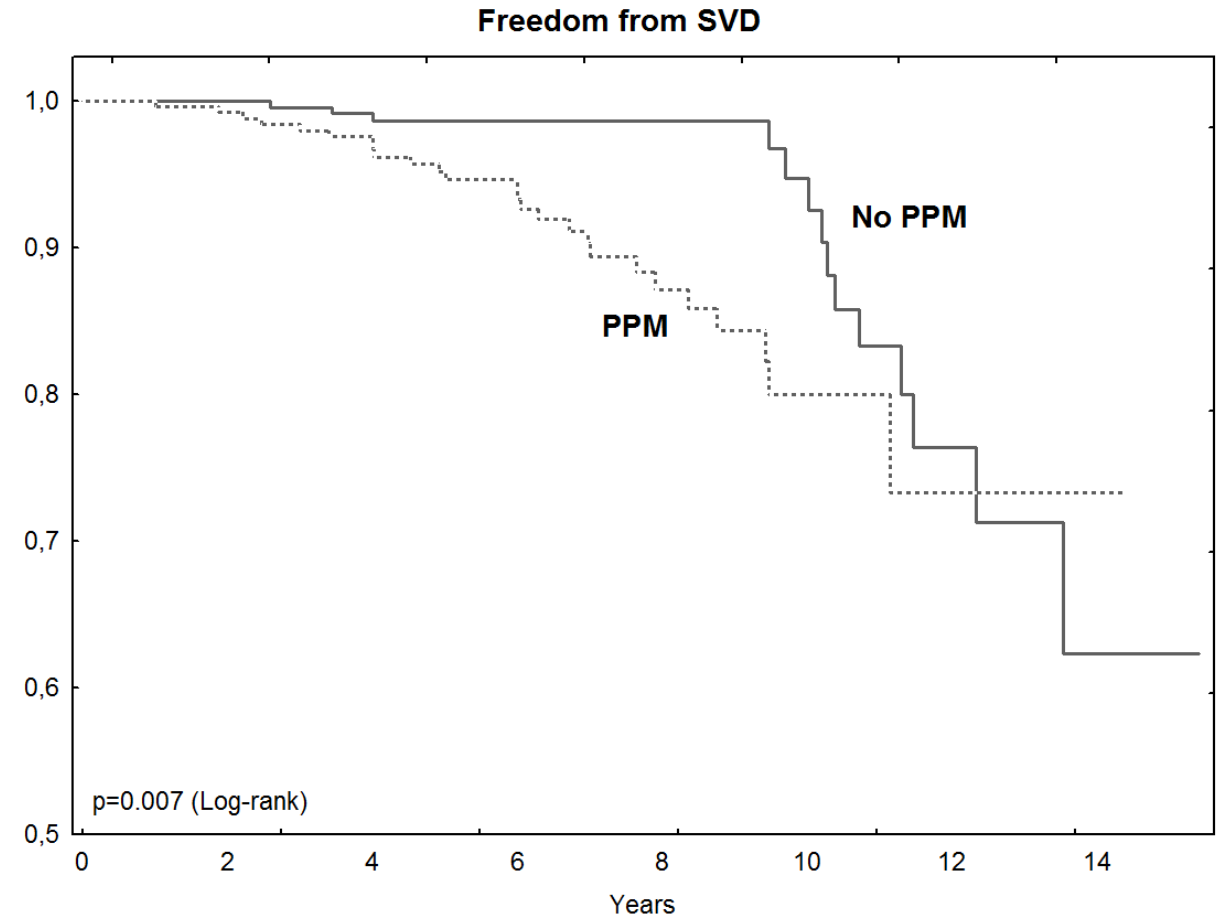
Rapid Deployment Valves: Intuity

- Facilitating minimal invasive surgery

Importance of valve size !

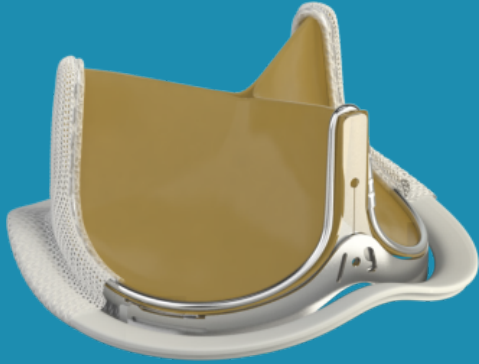


Johnston, JTCVS, 2015



Meuris, Circulation, 2010

New kids on the block ?



INSPIRIS Resilia

- FIM trial 2011
- Clinical since 2017
- Multiple prospective studies and registries



Perceval PLUS

- Clinical since 2020
- Perceval legacy since 2007
- Multi-center registry

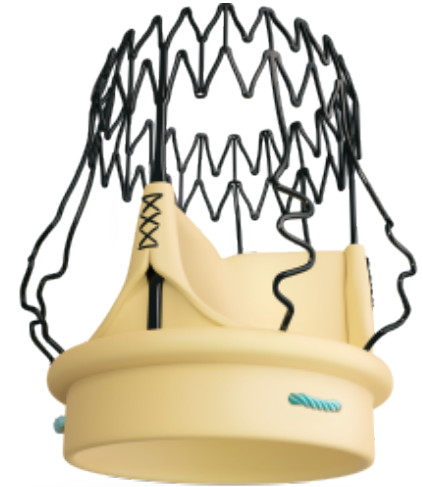
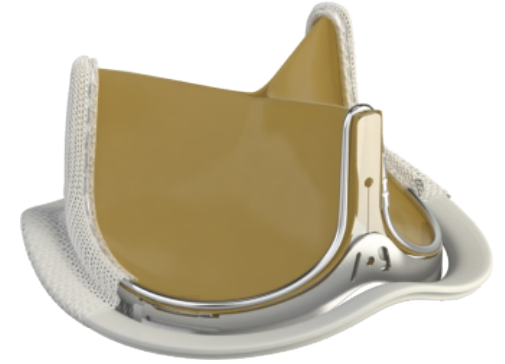


AVALUS

- FIM trial 2014
- Clinical since 2017
- Multi-center registry

Conclusions

- We live in a “tissue valve era”
 - Optimized tissue technology available
- Innovation constantly ongoing
 - Valve materials
 - Valve designs
 - Many novelties will also translate towards transcatheter techniques
- Younger patients
 - Can benefit from advanced tissue technology
 - Think about re-intervention
 - Sizing !
 - Valve-in-valve options



Thank you !



ADAPT treatment



ADAPT® anti-calcification process

- Acellular bovine pericardium with no residual DNA , alpha-Gal free
- No glutaraldehyde toxicity, thus no rinsing

